

HOME ACCESS MODIFICATIONS: EFFECTS ON COMMUNITY VISITS BY PEOPLE WITH PHYSICAL DISABILITIES

GLEN W. WHITE, ADRIENNE PAINE-ANDREWS,
R. MARK MATHEWS, AND STEPHEN B. FAWCETT

UNIVERSITY OF KANSAS

We examined the effects of access modifications to home entrances of people with physical disabilities on their reported community outings. An interrupted time-series design was used, in which the introduction of ramps was staggered across the homes of 6 people with moderate to severe mobility impairments. Four participants reported increases in weekly outings following installation of ramps at their entrances, and 2 reported a small decrease. These findings suggest that reducing the response requirements of access to and from the residence of people with mobility impairments may increase community visits, but may be insufficient given other environmental barriers in the community.

DESCRIPTORS: response cost, physically disabled, access modifications, independent living, community integration

According to the 1990 census, there are about 13.2 million people over the age of 16 years who have some difficulty with mobility, such as going outside the home alone (LaPlante, 1993). For the majority of these people with physical disabilities, accessibility is a critical issue that has been addressed by public policy. The Architectural Barriers Act of 1968, for example, mandated that all remodeled and new buildings constructed with federal funds be barrier free. Section 504 of the Rehabilitation Act of 1973 required institutions that receive federal funds (e.g., universities) to provide physical or programmatic accessibility for people with disabilities. Accessibility of rental housing was ad-

ressed in the Fair Housing Amendments Act (FHAA) of 1988. Most recently, the Americans with Disabilities Act (ADA) of 1990 reaffirmed the importance of access in the domains of (a) employment, by promoting reasonable accommodations in the work setting; (b) public accommodations, by requiring physical access in libraries, theaters, stadiums, and restaurants; (c) transportation, by encouraging fixed-route and para-transit buses with wheelchair lifts; and (d) telecommunications, by mandating state relay systems for the deaf or telephone devices for the deaf in public areas.

Despite the importance of accessible housing to enable people with physical disabilities to live more independently and increase their integration into society (National Council on the Handicapped, 1986), it is not widely available. A lack of affordable, accessible housing was cited as a top concern among people with disabilities (Fawcett et al., 1988; Suarez de Balcazar, Bradford, & Fawcett, 1988) and others responsible for providing independent living services (Jones, Petty, Boles, & Mathews, 1986).

The literature on accessible housing consists largely of descriptive and technical information. For example, Korpela (1992) has documented the need and means for making accessibility

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Requests for reprints should be sent to Glen W. White, University of Kansas, Department of Human Development and Family Life, 4001 Dole Center, Lawrence, Kansas 66045.

modifications. There is little available empirical literature, however, that examines how modifications that improve accessibility affect people with mobility impairments. Presumably, changes in physical accessibility permit people with a physical disability to contact the community without the inordinate response requirements presented by narrow passages, curbs, stairs, and other obstacles. That is, an accessible environment is likely to be one that can be traversed more quickly and with less effort. We explored this hypothesis in a pilot study by examining the time it took for 2 wheelchair users and 1 cane user with severe mobility impairments to enter and exit their homes with and without ramp installations. Before ramps were installed, all participants required assistance, crawled, or held onto railings, doors, and doorposts to enter and exit their homes in an average of 82 s. After installation, the participants independently entered or exited their homes in less time ($M = 25$ s), more safely, and with greater ease.

Although this pilot study suggested that removing environmental barriers decreased the response requirements to gain access to home and community, it did not answer the question of whether affected individuals would experience greater contact and integration with their communities. Accordingly, this experiment examined the effects of access modifications to home entrances on participants' reported visits into the community, an indicator of community integration.

METHOD

Participants and Settings

Six wheelchair users volunteered (and signed informed consent documents) to participate in this study. All participants, because of low income, were eligible for community development block grant funds to have an exterior ramp constructed at their homes.

The participants were Peg, Hazel, Stan, Pete, Ellen, and Mick. Peg was a 62-year-old white

woman with bone cancer in her hip, which affected her walking ability. She lived in her own home with an adult son who was rarely at home. Hazel was a 55-year-old white woman who had severe arthritis and a form of muscular dystrophy. She lived in a mobile home with her two daughters who had developmental disabilities. Stan was a 37-year-old African-American man who suffered an incomplete high-level spinal injury. He lived alone in a small rented house. An attendant assisted him with his daily needs. Pete was a 46-year-old African-American man who sustained a complete spinal injury that affected his lower extremities and also caused weakness in his upper body and arms. He lived in his home with his wife and three children at the beginning of the study, but due to preexisting marital difficulties, his wife and children left the home during Week 37 of the study. Ellen was an 82-year-old African-American woman who had a cerebral vascular accident (stroke) that affected her right side. Her primary mode of mobility was her wheelchair, but she occasionally used a walker to ambulate. She lived in her home with her husband of similar age, who was still able to drive. Mick was a 31-year-old African-American man who was born with cerebral palsy. Mick worked as a summer volunteer at a specialized school for people with developmental disabilities.

Measurement

Several weeks before the ramps were installed, the experimenter interviewed participants to obtain demographic and personal information. Participants rated the importance of, and their satisfaction with, their homes and their ability to make trips into the community. Participants also completed an adaptation of the Arizona Social Support Network Inventory (Barrera, 1981), which asked them to recall the type and frequency of social contacts that had occurred within the past 2 weeks. For example, each participant was asked to describe when others had provided emotional support, positive feedback, or tangible assistance.

Accessibility. To provide a measure of the independent variable, we directly assessed the accessibility of each residence approximately 1 to 5 weeks before and 1 to 2 weeks following modifications using criteria designated by the American National Standards Institute (ANSI, 1986). ANSI Standard 4.8.2 called for entrances to housing to be level or to have a maximum ramp slope of not greater than 1:12. (Thus, for every inch in height, the ramp would be a corresponding foot in length. For example, a 10-in. step would require a 10-ft ramp.)

Community visits. The researchers conducted weekly telephone interviews to obtain information about the number of times participants had ventured into the community and where they had gone during each outing. A community visit was defined as any instance when the participant reported crossing his or her property line (e.g., visiting a neighbor, going to the mall, going to the doctor), independent of the number of stops made during the trip.

Home visits. During the weekly interviews, participants were also asked about the number and relationships of people who came to their own homes. A home visit was defined as any instance when friends or relatives who did not reside in the participant's home crossed the participant's property line and made a personal contact with the participant. One visit was scored each time a personal contact was made, whether the contact was with only one person or several people. Thus, a group of friends coming to see a participant for an hour would be scored as one visit.

Verification of Self-Reports

Approximately 7 weeks after the study began, participants were asked to save any permanent products associated with their outings (e.g., bank receipts, ticket stubs, medical receipts). These were retrieved on a weekly basis by the experimenters. Only 3 participants (Hazel, Stan, and Pete) turned in any receipts (six, six, and one, respectively). All 13 of these receipts were collected from outings following ramp in-

stallation. We also verified three outings made by 2 participants (Peg and Ellen) after ramp installation by speaking with someone whom these participants reported contacting during the outings. These verifications, obtained within 1 week of the outings, included Ellen's pastor, Peg's friend, and Peg's physician. Thus, one verification was obtained during baseline (for Ellen), and at least one verification was obtained following intervention for 4 of the 6 participants (Peg, Hazel, Stan, and Pete). None of the verification checks revealed any discrepancy in data reported by the participants.

Experimental Design and Procedures

A multiple baseline across participants was used to analyze the effects of home access modifications on the frequency of participants' trips into the community and visits into their homes by others. This study included a baseline condition and a home access modification condition.

Baseline. During this condition, participants entered and exited their residences through their main entrances before any access modifications. Peg could not leave her house without assistance from others. There were three steps, each with a rise of 15 to 20 cm, leading to her front entrance. There was no railing. Hazel could not leave her home without assistance from others. There were eight steps, each with a rise of 10 to 12 cm, to her front entrance. Stan could not enter or exit his home independently because there was a 15- to 20-cm step at both entrances. During baseline, a small plywood ramp extended from the ground to Pete's front porch. From the porch level, there was a 15-cm step into his home. Pete reported that he was unable to enter or exit his home without physical assistance. Ellen reported climbing four steps, each with a rise ranging from about 10 to 25 cm. She climbed the steps with the use of hand rails and grab bars attached to the outside of her home. Ellen also reported that friends and family members frequently assisted her from her home while she remained in her

wheelchair. A very steep ramp was attached to Mick's front porch during baseline. The ramp slope was at approximately a 1:8 ratio compared to the ANSI-required 1:12 slope. Mick reported that he usually needed assistance to use the ramp when entering or exiting his home.

Home access modification. In 5 of 6 participants' homes, ramps were built to ANSI specifications of a 1:12 slope. Due to hilly terrain around Peg's home, her ramp was built slightly steeper than ANSI specifications (about a 1:10 slope). The ramps remained in place at participants' homes following data collection.

RESULTS

Figure 1 presents the number of weekly community visits reported by participants before and after ramps were installed at their homes. The mean number of participants' weekly trips out of the house during baseline was 1.2 (range, 0.1 to 2.6). Following ramp installations, the mean number of reported trips increased to 3.0 (range, 0.6 to 10.5). The data suggest an increase in trips out of the house for Peg, Hazel, Stan, and Pete following home access modifications, but there was a decrease following home access modifications for Ellen and Mick.

Data were also collected on the number of weekly personal contacts by others at the participants' houses before and after the ramps were installed. An overall group mean of 6.2 weekly visits was reported during baseline (range, 2.1 to 12.3); this increased to 8.1 (range, 2.0 to 15.6) following ramp installations. The data suggest slight increases for Hazel (baseline $M = 6.6$; postintervention $M = 10.0$), Pete (5.9 to 15.6), and Ellen (6.5 to 8.6). There appeared to be little change for Mick (2.1 to 2.0) and a slight decrease in home visits for Stan (5.0 to 3.6) and Peg (12.3 to 8.7).

Before and after ramps were installed, each participant rated the importance of, and their satisfaction with, access to their residences. Participants consistently rated the availability of accessible entrances as being important, with

mean scores of 5 (on a scale of 1 to 5, with 5 the highest). The majority of participants expressed low levels of satisfaction with the entrances to their homes during baseline ($M = 1.8$; range, 1 to 4). Following installation of ramps, all participants rated their level of satisfaction as 5.

Data were also collected regarding the size of each participant's social network before and after the intervention. The participants' overall mean social network size was reported to be 7.3 (range, 2 to 13) during baseline, and increased slightly to 8.8 (range, 4 to 15) following ramp installations. Participants' ratings of satisfaction with their social networks was 2.8 (range, 2.4 to 3) during baseline. Following ramp installations, there was a slight overall increase in participants' satisfaction ($M = 3.0$; range, 2.8 to 3).

DISCUSSION

The primary dependent variable of this study was participants' reported visits out of the house before and after ramps were installed. The data showed considerable variability in trips out of the house for most participants. This variability might have been due to other environmental events (e.g., hot or cold weather, or rain), demands (e.g., phone calls from friends wanting to go to a restaurant), or prearranged appointments (e.g., a visit to the physician). Physical factors (e.g., health or severity of disability) may also affect the degree of community integration of people with disabilities. For example, Pete developed pneumonia after the ramp was installed, and Stan developed a kidney infection that limited travel after the ramp was installed at his home.

Only a few verifications of self-reported trips were collected during this study. This raises a possible concern of whether some other factors may account for the results. For example, participants might have increased their reports of trips in an attempt to please the experimenter. However, verification data that were collected,

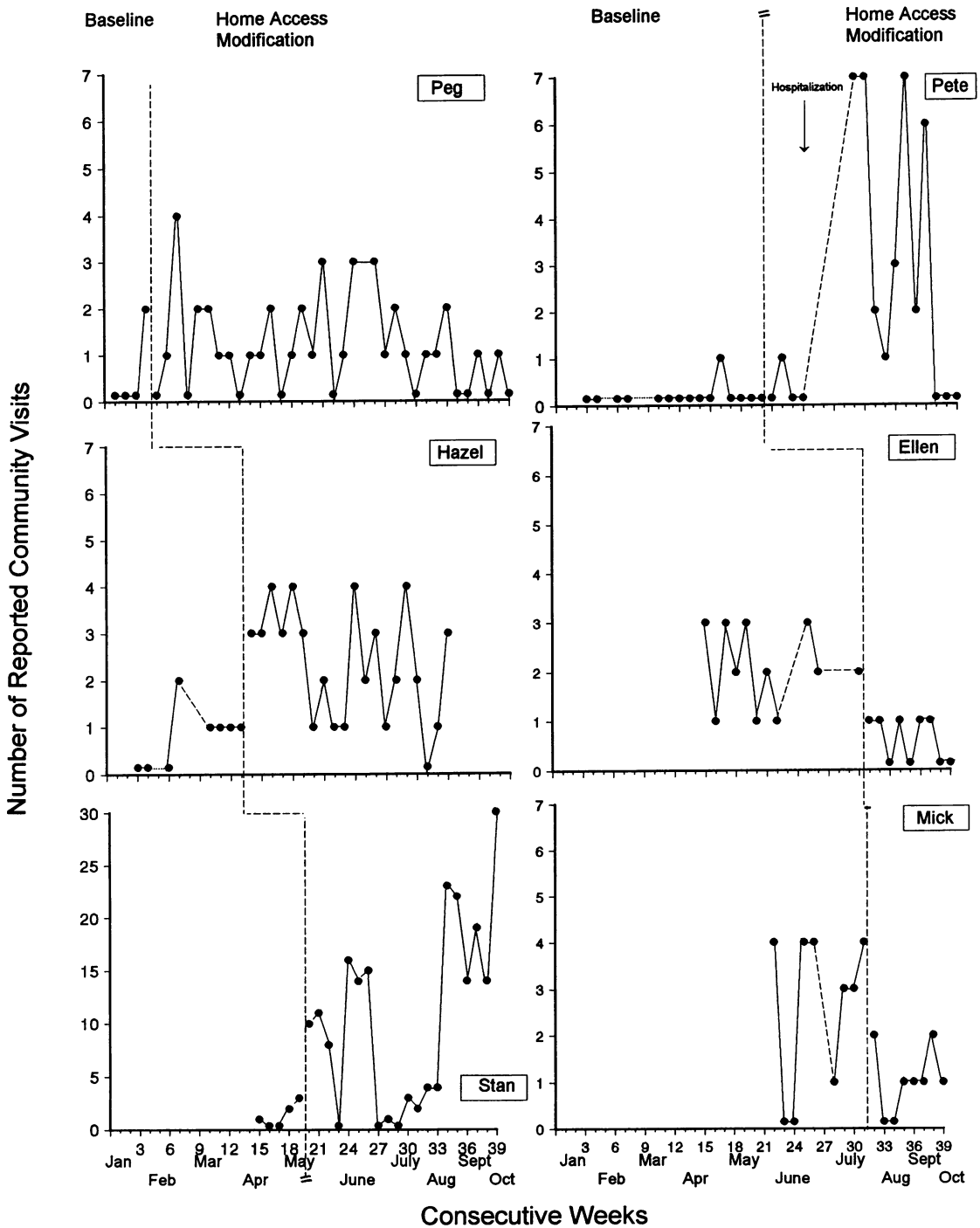


Figure 1. Number of reported community visits before and after home access modifications. (Note that the y-axis scale for Stan's data is different from those of the other participants.)

along with evidence that the intervention had little effect with 2 participants, suggest that any demand characteristics that may have existed were minimal. Future research should provide fuller assessments of the reliability of self-report data.

The data suggest that access modifications may have had some effect on trips into the community by 4 of the 6 participants (Peg, Hazel, Stan, and Pete). Because they reported access to transportation from friends, family members, or personal vehicles, Peg, Hazel, and Stan may have gained more ready access to the broader community following improvements to their homes. Ellen, one of the participants for whom no effects were noted, relied primarily on her husband, who also had some physical limitations due to his advanced age, for transportation into the community. Mick, for whom no effect was noted, had limited access to transportation. Although limited para-transit service was available to people with disabilities, it was dedicated primarily to getting people with disabilities to work or to medical services. People such as Mick were accepted for rides on a first come, first served basis. Further, approximately 1 week after Mick's ramp was installed, the educational facility at which he had been volunteering closed for the summer. Because Mick's volunteer services were no longer needed and the educational facility's transportation services were discontinued for the summer, reduced demands and resources may have accounted for the observed decline in his weekly trips out of the house.

Overall, there was a 60% mean increase in reported trips out of the house following ramp installations at participants' homes. This may not, however, represent the total impact. Each time a person left his or her home to go into the community, it was counted as only one trip. On many occasions, however, participants reported going to several community sites (e.g., a restaurant, a movie theater, and the mall) over the course of a single outing. Future studies might examine both the number and variety of

discrete settings contacted as a function of environmental modifications.

It was hypothesized that if participants were able to visit the community more often, adverse side effects might occur. A reduced number of visits into the participant's home was of special concern. That is, if participants were more independent within the community, people in their personal network might visit them less often. Although the data for home visits show some variability, an overall decreasing trend in home visits was not observed to correspond to increases in participants' trips into the community. In fact, compared to baseline levels, there was an overall mean increase (23%) in home visits reported by participants after access modifications were made. For example, Hazel reported that several friends with mobility-related disabilities visited her once or twice a week following ramp installation.

The costs of home access modifications, such as the wooden ramps, should be considered when determining whether such accessible housing programs might be adopted by other communities. Early in the development of this research project, the first author (who has a mobility impairment), the housing specialist at a local independent living center, and the Topeka Community Development Office staff collaborated on the development of different ramp designs. This resulted in the design of modular-constructed ramps made of treated lumber that were portable and could be reused. Depending on the size and difficulty of the terrain, participants' ramps constructed in this manner cost between \$675 and \$2,650 ($M = \$1,615$). Future research might conduct a full cost-benefit analysis, including information on requirements for personal assistance, projected savings from reduced injury, and increased opportunities to contribute through volunteer work and paid employment.

Home access modifications may be a necessary condition for social integration, particularly among some low-income people with severe physical disabilities. However, ramps alone are

not a complete solution. A ramp may enable the person to get across the threshold, but a lack of public transportation may limit access beyond the property line. Similarly, inaccessible public buildings may prohibit entry to the ultimate destination. Thus, modifications in the broader environment are also necessary to increase opportunities for community integration.

The complex process of community integration may only be as good as its weakest link. Economic and environmental barriers may limit access to the community for people with physical disabilities. As illustrated by this research, public investments in environmental modifications reduce unnecessary response requirements including the time and effort associated with getting out into the community. Such investments may be empowering, enabling people with disabilities to influence events, such as getting involved in community affairs (Fawcett et al., 1994). Applied research into the efficacy of environmental modifications may contribute to society's goal of enabling people with physical disabilities to lead fuller and more independent lives.

REFERENCES

- American National Standards Institute. (1986). *American national standard for buildings and facilities: Providing accessibility and usability for physically handicapped people* (ANSI A117.1-1986). New York: Author.
- Americans with Disabilities Act of 1990. P.L. 101-336.
- Architectural Barriers Act of 1968. P.L. 90-480.
- Barrera, M. (1981). Social support in the adjustment of pregnant adolescents: Assessment issues. In B. H. Gottlieb (Ed.), *Social networks and social support* (pp. 69-96). Beverly Hills, CA: Sage.
- Fair Housing Amendments Act of 1988. P.L. 100-430.
- Fawcett, S. B., Suarez de Balcazar, Y., Whang-Ramos, P., Seekins, T., Bradford, B., & Mathews, R. M. (1988). The concerns report: Involving consumers in planning for rehabilitation and independent living services. *American Rehabilitation*, 14, 17-19.
- Fawcett, S. B., White, G. W., Balcazar, F. E., Suarez de Balcazar, Y., Mathews, R. M., Paine, A. L., Seekins, T., & Smith, J. F. (1994). A contextual-behavioral model of empowerment: Case studies with people with disabilities. *American Journal of Community Psychology*, 22, 471-496.
- Jones, M. L., Petty, C. R., Boles, C., & Mathews, R. M. (1986). Independent living: A survey of programs and service needs. *Rehabilitation Counseling Bulletin*, 29, 278-283.
- Korpela, R. A. (1992). A regional survey of the housing circumstances of families with children experiencing intellectual and motor disabilities. *Disability and Rehabilitation*, 14, 176-182.
- LaPlante, M. (1993). *Disability statistics report: State estimates of disability in America*. Washington, DC: U.S. Department of Education, National Institute on Disability and Rehabilitation Research.
- National Council on the Handicapped. (1986). *Towards independence: An assessment of federal laws and programs affecting persons with disabilities*. Washington, DC: U.S. Government Printing Office.
- Rehabilitation Act of 1973. §504, P.L. 93-112.
- Suarez de Balcazar, Y., Bradford, B., & Fawcett, S. B. (1988). Common concerns of disabled Americans: Issues and options. *Social Policy*, 19, 29-35.

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